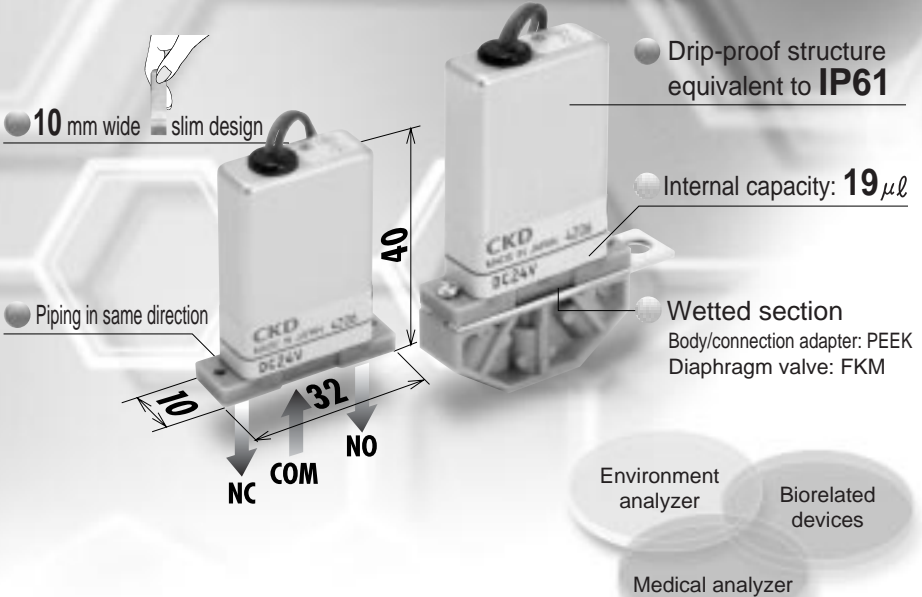


MR10 Series

Extracompact space saving with slim 10 mm profile

Highly accurate analysis controls even minute amounts of chemicals.

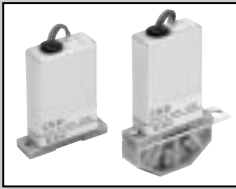


Ideal for analyzer dispensing

This metal-free, compact 2 or 3-port solenoid is useful valve for chemicals. Resin and rubber are used for wetted sections. The slim console, space-saving design, outstanding installation, safety, reliability, and long-life design ensure high overall performance.

- Long-life up to 1,000 million times
Results of test under CKD test conditions
- Internal capacity: **19 µl**
The inside of the solenoid valve is easy to wash. Reagent wastes are reduced.
- Heat-suppressing design
The effect of heat radiated from coils onto analysis frequency is minimized, saving power.
- Two piping methods
Select piping suited to your application.
- Two-port and 3-port valves have the same shape.





MR10 Series

- NC (normally closed) type, NO (normally open) type, universal type
- Working fluid: water, deionized water, chemical liquids
- Port size: M5, M6

HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/ADK

For dry air

Explosion proof

HVB/HVL

SAB/SVB

NP/NAP/NVP

CHB/G

MXB/G

Other G.P. systems

PD/IFAD/PJ

CVE/CVSE

CPE/CPD

Medical analysis

Custom order

Medical analysis process components
Compact metal free chemical liquids 2, 3 port solenoid valve

JIS symbol

- 2 port: NC (normally closed) type



- 2 port: NO (normally open) type



- 3 port: universal type



Specifications

Descriptions	2 port		3 port
	MR10-2NC	MR10-2NO	MR10-3
Actuation	NC (normally closed) type	NO (normally open) type	Universal type
Working fluid	Water, pure water, chemicals (fluid not to corrode wetted areas materials)		
Working pressure range MPa (*2)	-0.05 to 0.1		
Sealing pressure range MPa (*3)	-0.05 to 0.2		
Withstanding pressure (water) MPa	0.4		
Fluid temperature °C	5 to 50		
Ambient temperature °C	5 to 50		
Valve seat leakage cm ³ /min	0 (water pressure)		
Cv flow factor	0.03		
Orifice mm	1		
Volumetric capacity μℓ (*4)	19		
Protection grade	Equivalent to IP61		
Valve structure	Diaphragm type direct acting (rocker type)		
Mounting attitude (* 5)	Free		
Weight gr	18		
Durability (* 6)	10 million times		
Electrical specifications			
Rated	Continuous		
Voltage (*7)	24 VDC / 12 VDC		
Allowable voltage fluctuation	±5%		
Power consumption W (*8)	Starting	3.6 (24 VDC) / 4.2 (12 VDC)	
	Holding	1	
Leakage current mA (*9)	1.0 or less (24 VDC) / 2.0 or less (12 VDC)		
Heat proof class	B		

*1: Read the Safety Precautions for MR10 (page 768).

*2: Pressure range at which the solenoid valve can be switched ON or OFF.

*3: Pressure range at which the valve seat can be sealed.

*4: Volume of wetted area formed by the product and diaphragm. Note that piping volume is excluded.

*5: Install vertically so that the coil where little fluid accumulates is at the top.

*6: These test results are based on CKD test conditions.

*7: A solenoid valve has polarity. Connect the red lead to the plus (+) side.

*8: Time from energizing to 50 mS.

*9: Keep leakage current from the control circuit within the levels below.

MR10 Series

How to order

● Direct piping type

MR10 - 2NC - 5 - DC24V

● Actuator type

MR10 - 2NC - DC24V

Series

A No. of port, type

B Port size

C Rated voltage

Symbol	Descriptions
A No. of port, type	
2NC	2 port, NC (normally closed) type
2NO	2 port, NO (normally open) type
3	3 port, universal type
B Port size	
Blank	Actuator type
5	M5
6	M6
C Rated voltage	
DC24V	24 VDC
DC12V	12 VDC



Safety precautions

Always read this section before starting use.

Medical analysis process components

Design & Selection

WARNING

1 Working environment

Provide appropriate guarding measures when using in an environment where the product could be subject to water drip.

CAUTION

- (1) Make sure that fluids do not adhere to the product body.
- (2) Carefully select the solenoid valve taking the chemical characteristics into consideration. (Presence of crystal deposits when chemicals dry, effect to solenoid valve component materials if chemicals evaporate, etc.)
- (3) When using these components for chemicals having a low boiling point, such as hexane, the chemicals in the solenoid valve could evaporate due to heating of the coils, and cause bubbles, etc., in the solenoid valve and pipe. Use the air operated valve AMD for chemicals if formation of bubbles, etc., poses a problem.
- (4) When using the solenoid valve with a negative pressure, such as for dispensing control, air may be sucked into the solenoid valve depending on the type of chemical, type of connection joint, and type of tube, etc. Check the state carefully before start.

Installation, Piping and Wiring

CAUTION

1 Tighten the piping with the following torques.

Note that if the solenoid valve body is made of resin, a resin joint must be used. The port could be damaged if a metal joint is used.

<<Stainless steel body solenoid valve>>

Nominal port size	Tightening torque [N·m]
M5	2.1 to 3
Rc 1/8	18 to 20
Rc 1/4	23 to 25
Rc 3/8	31 to 33

<<Polyvinyl chloride body solenoid valve>>

Nominal port size	Tightening torque [N·m]
R 3/8	1.5 to 2.0
R 1/2	2.0 to 2.5
R 3/4	2.5 to 3.0

<<Fluorine resin body solenoid valve>>

Nominal port size	Tightening torque [N·m]
M6	0.05 to 0.08
Rc 1/4	0.7 to 1.0
Rc 3/8, R 3/8	1.0 to 1.5
Rc 1/2, R 1/2	1.5 to 2.0
R 3/4	2.0 to 2.5

<<PPS, PEEK body solenoid valve>>

Nominal port size	Tightening torque [N·m]
M5, M6	0.10 to 0.15
Rc 1/8	0.5 to 0.8
Rc 1/4	1.0 to 1.5
Rc 3/8	1.0 to 1.5

Precautions for using MR10

CAUTION

- (1) Check compatibility between the material of each components and working fluid.
- (2) Do not use for hydrochloric acid, hydrofluoric acid, or nitric acid.
- (3) Foreign matter etc. inside pipe may cause malfunction and valve seat leakage. Please securely implement air flushing.
- (4) When standing secondary piping, do not make it higher than 2 m. Use tubing or pipes with a bore the same size or larger than the orifice diameter, and fix the pipe in place.
- (5) Do not disassemble the product.

The required performance may not be satisfied even if a disassembled product is reassembled.

Precautions for using MAB1 and MAG1

CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks.
Always flush the piping before installing the valve.
- (2) When using strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid, use the AMD type air operated valve for chemicals.
Consult with CKD when using sodium hypochlorite (soda).
- (3) Consult with CKD if the secondary piping is laid at a high level or extremely restricted.
- (4) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.

Precautions for using MYB₃¹, MYG₃¹, MEB2 and MEG2

CAUTION

- (1) Check compatibility between the material of each components and working fluid.
Working fluid must not adhere to main body.
- (2) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks.
Always flush the piping before installing the valve.
- (3) Do not use metal joints. They could damage the port. Use a PP or fluorine resin joint.
Tighten the joint connection using the recommended torque.

- (4) When using strong acids and solvents such as hydrochloric acid, hydrofluoric acid or nitric acid, use the AMD type air operated valve for chemicals. Consult with CKD when using sodium hypochlorite (soda).
- (5) Current leakage from the control circuit must be less than that specified for each voltage.
- (6) Consult with CKD if the secondary piping is laid at a high level (2m and over) or extremely restricted.
- (7) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.

Precautions for using MJB3

CAUTION

- (1) Check compatibility between the material of each components and working fluid.
Working fluid must not adhere to main body.
- (2) Foreign matter etc. inside pipe may cause malfunction and valve seat leakage. Always flush the piping before installing the valve.
- (3) Do not use for hydrochloric acid, hydrofluoric, acid or nitric acid. Before using a permeable fluid, contact CKD. The fluid could permeate the diaphragm.
- (4) Consult with CKD if the secondary piping is laid at a high level (2m and over) or extremely restricted.
- (5) Do not apply excessive force on the joint when connecting or disconnecting the tube.
- (6) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.

Precautions for using EMB21

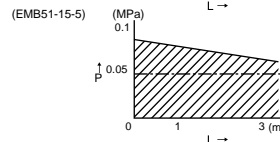
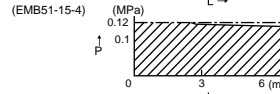
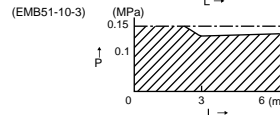
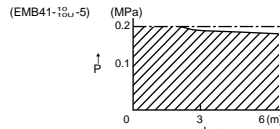
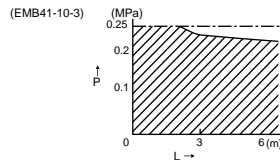
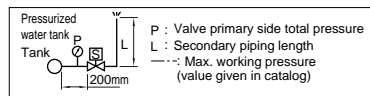
CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
- (2) Consult with CKD if the secondary piping is laid at a high level.
- (3) When using strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid, use the AMD type air operated valve for chemicals. Consult with CKD when using sodium hypochlorite (soda).
- (4) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.

Precautions for using EMB41 and EMB51

CAUTION

- (1) Foreign matter in the piping and the environment during piping work could damage the valve seat or diaphragm seal, and lead to leaks. Always flush the piping before installing the valve.
- (2) Use VCTF-0.75 (2-conductor: outer diameter 6.6) vinyl code for equipment (JISC3306) for the led out wires.
- (3) Use the PFA-10-8 for the EMB41-10U tube.
- (4) Consult with CKD if the secondary piping is laid at a high level.
- (5) When using strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid, use the AMD type air operated valve for chemicals. Consult with CKD when using sodium hypochlorite (soda).
- (6) Note that the working pressure will change particularly according to the OUT side piping conditions, so refer to the characteristics in the following graph before using. (Note that these characteristics are for water.)



HNB/G

USB/G

FAB/G

FGB/G

FVB

FWB/G

FHB

FLB

AB

AG

AP/AD

APK/ADK

For dry air

Explosion proof

HVB/HVL

SAB/SVB

NP/NAP/NVP

CHB/G

MXB/G

Other G.P. systems

PD/FAD/PJ

CVE/CVSE

CPE/CPD

Medical analysis

Custom order

Medical analysis process components



Safety precautions

Always read this section before starting use.

Medical analysis process components

Precautions for using M

CAUTION

- (1) Oil is sealed inside, so do not disassemble the product.
- (2) This product is not treated for oil-prohibition use.
- (3) If the diaphragm is damaged during use, oil will flow into the fluid. Consider this when making a selection.
- (4) When using strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid, use the AMD type air operated valve for chemicals.
Consult with CKD when using sodium hypochlorite (soda).

Precautions for using HMTB/HMTG

CAUTION

- (1) Use a direct current power supply excluding rectified direct current.
- (2) Do not apply excessive force on the joint when connecting or disconnecting the tube.
- (3) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.
- (4) When using strong acids such as hydrochloric acid, hydrofluoric acid, nitric acid, or use the AMD type air operated valve for chemicals.

Precautions for using UMB and UMG

CAUTION

- (1) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.
- (2) Do not apply torque exceeding $0.3 \text{ N} \cdot \text{m}$ on the mounting bolt.
- (3) Protect the product against contact with water. Water could cause insulation or operation faults.
- (4) When using strong acids such as hydrochloric acid, hydrofluoric acid, nitric acid, or use the AMD type air operated valve for chemicals.

Precautions for using HB

CAUTION

- (1) Foreign matter etc. inside pipe may cause malfunction and valve seat leakage. Please securely implement air flushing before installing the valve.
- (2) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.
- (3) When using strong acids such as hydrochloric acid, hydrofluoric acid or nitric acid, or sodium hypochlorite (soda) use the AMD type air operated valve for chemicals.

Precautions for using HYN

CAUTION

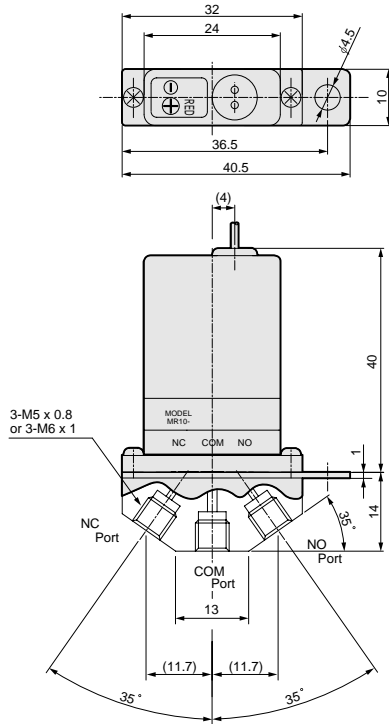
- (1) Use the power voltage within the average 24 VDC value and 4.8 VP-P ripple. (When using an average 12 VDC value, the ripple must be within 2.4VP-P.)
- (2) When using a DC-specification product with a full wave rectified AC power supply, the power must be smoothed to attain the aforementioned ripple voltage range. Consult with CKD for more information.
- (3) Tighten the HYN-2, 3 screw with a torque of 0.2 to $0.4 \text{ N} \cdot \text{m}$, and the HYN-5, 8 screw with a torque of 0.5 to $0.7 \text{ N} \cdot \text{m}$. (When the screw engagement length is 5mm.)
- (4) Securely insert the tube to the designated position.
- (5) The performance may not be satisfied if a non-recommended tube is used.
- (6) Depending on the working fluid, the silicon tube may not be resistant to the chemicals, or the chemicals may adhere. Confirm this state before starting use.
- (7) The DC-specification product has a polarity. (Red = \oplus)
- (8) Do not disassemble the product.
The required performance may not be satisfied even if a disassembled product is reassembled.
- (9) Do not apply water on the coils.
- (10) The noise-resistance crest values are shown below. (These do not apply for HYN-2.)

Rated voltage	Noise-resistance crest (pulse amplitude 1, μsec)
12 VDC	120V
24 VDC	200V
100 VAC	1000V

When using this product with an electrical circuit that generates noise (instantaneous overvoltage) exceeding this crest value, the transistor circuit board could be damaged causing an overvoltage to flow and burn the coils.

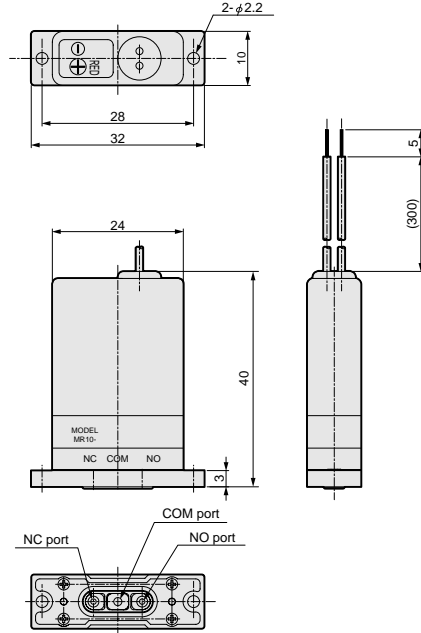
Dimensions

● Direct piping type



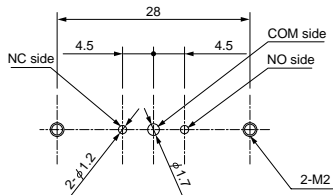
Note: The MR10-2NC's NO port is plugged
The MR10-2NO's NC port is plugged

● Actuator type



Note: The MR10-2NC has no hole machined for the NO port
The MR10-2NO has no hole machined for the NC port

● Mounting dimensions of actuator



* Different adaptors and manifolds are custom-made.
Consult with CKD for details.

● Main part materials

Parts name	Material
Diaphragm	FKM Fluoro rubber
Wetted areas	Body PEEK Polyether ether ketone
	Packing seal FKM Fluoro rubber
	Connection adaptor PEEK Polyether ether ketone

HNB/G
USB/G
FAB/G
FGB/G
FVB
FWB/G
FHB
FLB
AB
AG
AP/AD
APK/ADK
For dry air
Explosion proof
HVB/HVL
SAB/SVB
NP/NAP/NVP
CHB/G
MXB/G
Other G.P. systems
PD/FAD/PJ
CVE/CVSE
CPE/CPD
Medical analysis
Custom order

Medical analysis process components
Compact metal free chemical liquids 2, 3 port solenoid valve